DOCUMENT RESUME

ED 171 672 SP 014 295

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TITLE Adaptation of Nutrition Educator Determined Objectives for Learner Developmental Levels.
PUB DATE Apr 79
NOTE 13p.; Paper presented at the American Educational Research Association Annual Meeting, (San Francisco, California, April 1979)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Behavioral Objectives; *Curriculum Development; Elementary Secondary Education; *Health Education; *Instructional Programs; Models; Nutrition; *Nutrition Instruction; Program Design

ABSTRACT

The development of curriculum in the area of nutrition is focused on with emphasis on developing norm-forming communication. Emphases by grade level from preschool to senior high are presented, and nine basic characteristics of a curriculum are outlined: (1) the curriculum should be longitudinal; (2) the curriculum should set basic nutritionally sound standards for decision making; (3) the curriculum should be deliverable through various subject area disciplines; (4) the curriculum should be comprised of exemplary instructional segments; (5) flexibility in presentation modes, learning activities, and cultural identity should be stressed; (6) material should encourage teachers to spin off; (7) the materials should include nutrition instruction for teachers that exceeds that presented to the students; (8) the materials should be addressed to the teacher rather than to serve as a student textbook; and (9) teacher preparation requirements should be as undemanding as possible. (DS)

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Adaptation of Nutrition Educator Determined Objectives for Learner Developmental Levels*

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School Nutrition Education Curriculum Study

In 1975, while the survey of the members of the Society for Nutrition Education (SNE), described by Helen Guthrie, was being conducted, six-week summer workshops were held for heterogeneous groups of teachers, food service directors, school nurses, and building administrators. The workshops constituted an exploration of a staff development approach, in which the nutrition curriculum itself and the methods for implementation were to grow from school needs and resources (Jordan, 1978). Workshop participants were to inspire their own faculties to incorporate nutrition into their curricula.

Teachers, curriculum coordinators, and school administrators throughout the state all agreed there was not room in the curriculum for an additional subject like nutrition nor for additional time for health instruction. Consequently, it was decided that the approach to nutrition instruction must permit coupling nutrition with as many subject areas as possible.

At that time three assumptions governed the approach: (1) teachers were sufficiently knowledgeable of the ways their bodies functioned, to permit easy relating of nutrition concepts; (2) understanding of nutrition principles through such a course would be sufficient to enable teachers to discriminate adequately between the nutrition facts and fiction presented by various forms of the popular press; and (3) teachers, with little guidance would be able to develop their own interdisciplinary instructional activities for teaching valid nutrition.

The workshops disclosed that the participants knew very little about human body function. That which was known tended to be gross organ-function associations rather than the cellular-molecular mechanisms which would assist teachers in understanding the "whys" behind the various nutrient needs.

The goal of having participants become active nutrition decision-makers was thwarted by the difficulty they had in acquiring the necessary nutrition background at adequate rates. This latter observation was supported by Carver's (1977) disclosure that a college course in nutrition was ineffective in providing elementary teachers sufficient nutrition understanding to enable them to identify the validity of nutrition statements in popular articles and books.

Performance of workshop participants also indicated that teachers, when undirected, tended to produce activities which emphasized food manipulation rather than nutrition understanding. Moreover, there was no systematic agreement as to which activities were most appropriate for which age levels of students. Those nutrition principles that were translated into learning activities tended to become error-prone and/or simplistic slogans. Finally, the participants in the workshops tended to be unimaginative in selecing instructional modes or subject matter other than health lectures or reading assignments to serve as vehicles for nutrition instruction. A literature review indicated no cases in which the didactic approach was effective in changing dietary behavior (Bell, 1978).

*American Educational Research Association Annual Meeting, San Francisco, April, 1979

By comparing the observations from the summer workshops with the recommendations from the White House Conference (U.S. White House, 1970), it was apparent that the expectations of depth and breadth of instruction were much greater than teacher workshops could deliver. A different approach to curriculum change was needed.

Another factor that influenced the decision to design an instructional program was the lack of existing coordinated, articulated curricula or instructional materials that systematically exacted higher cognitive thought, skill development or attention to attitude toward nutrition. Existing materials were certainly not value-free, but the values being projected tended to be those of accepting admonitions and fear of consequences resulting from inattention to nutrition. The suspicion that teachers were heavily dependent upon availability of instructional materials, especially textbooks, was corroborated in a National Survey and Assessment of Instructional Materials (1976), conducted during the 1974-75 academic year, and a study by Davis, Frymier and Clinefelter described by Komoski (1978).

The curriculum development process paralleled the approach used by the National Science Foundation in the late 1950's and early 1960's. (Havighurst, 1978). The approach was a legacy from the "scientific ideology" described by Edson (1978, p. 65) as "Stressing themes of expertise, specialization and efficiency." Unlike the NSF curriculum development projects, Nutrition In A Changing World lacked resources for funding:

large writing conferences comprised of research scholars and teachers
nation-wide pilot implementation sites
national testing and test revision phases
publication of student textbooks
heavy emphasis on laboratory inquiry
national, subsidized teacher-training institutes
focus on the heuristics of the subject discipline

The primary features retained from the NSF projects were:

(1) a heavy emphasis on extensive student involvement in the learning activities,
(2) the reliance on research scholars for the development of the curriculum, and
(3) the production of a detailed, comprehensive, longitudinal program of learning.

The prevailing philosophy underlying the decision is described as the Neo-Conservative Approach by Robert Ubbelohde (1976). The emphasis is toward developing norm-forming communication. Leadership may be applied by outside groups, but democratic deliberation is sought within schools, districts or states. All parties are expected to place their efforts into norm-forming (in the case of nutrition, norm-raising) changes. The driving assumption for the neo-conservative position is "shared humanness" of all persons. It denies the validity of radical or liberal arguments for the acceptance of cultural pluralism in curriculum theory or practices. Tolerance of diverse behaviors may be accommodated, however.

> "Tolerance of culturally different behaviors and customs within educational programs and awareness of these differences in developing curricula should infuse educational practice aimed at norm-forming communication." (p. 29).

This distinction between acceptance and tolerance of cultural pluralism permitted the translation of fundamental nutrition principles as resolute while permitting the use of examples from various regional, religious, ethnic or cultural origins which accomplished the same principles.

The basis for norm-forming was derived from the White House Conference recommendations as interpreted by Sherman, Lewis, and Guthrie (1978) into objectives, which were aligned into factors by the survey of the SNE membership (Barnette and Branca, 1978). The factors were then arranged into meaningful cognitive sequences through the task analysis procedure described by Gagne' (1970). Because the first ranked factor, Relation of Nutrition and Health, was unlikely to be learned adequately for transfer and application without an understanding of the mechanisms underlying the fifth ranked Food, Nutrients and Body Functions, the two factors were combined. (See Table 1.)

TABLE 1

Comparison of SNE Factor Rankings and Sequence Resulting from Task Analysis

Label	SNE Ranking	Sequence from Task Analysis
Relationship of nutrition & health	1	1
Food, nutrients & body functions	5	1
Application of scientific and practiced information in food choice decisions	2	2
Planning nutritionally adequate meals	3	3
Social and cultural aspects of food choice and use	6	4
Solution of family and community nutrition-related problems	4	5
Identification of global nutrition-related problems	7	6
Nutrition as a career	8	7

Consideration of child developmental capabilities resulted in a scope and sequence grade level cluster by objective. A summary of the emphases by level is shown in Figure 1 (Bell, 1976a).

Figure 1

Level	Ages	Emphasis
Preschool	3-5 years	sensory awareness of food characteristics, association of good eating with foods and food sources.
Primary	Grades 1-3	nutrient vocabulary development, planning meals under various settings.
Intermediate	Grades 4-6	personal nutrition based on the relations between body function-nutrient-food sources; dietary decision-making skills.
Junior High	Grades 7-9	dietary decisions for close associates; peers, family, local community.
Senior High	Grades 10-12	local, state, national, international issues and policy making.

Figure 1. A Summary of Emphases By Level

Task analysis of the main factors resulted in the sequence of units shown as Appendix A. Parts of the sequence were hierarchically related; others obviously were not.

Experience with the summer workshops precluded mere acceptance of a logically derived scope and sequence nutrition concepts. The norm-forming learning target was daily dietary decision making based on authentic nutrition principles. Decision-making demands knowledge and upper taxonomic levels of cognition, skills, some of which are psychomotor, and positive attitudes at the commitment levels. The learner was expected to develop "competence" as contrasted by Doll (1977) from "performance." Competence connotes sufficiency; citizens were making decisions prior to the White House Conference, but were not perceived as making them with sufficiency.

Moreover, the teachers were not performing with sufficiency the transmittal of nutrition commensurate to the pedagogical standards necessary for impact on their students. Cognitive style (Letteri, 1977), learner's active role (Tyler, 1977), interdisciplinary approaches (Cohen, 1978) and diversity in the curriculum (Havighurst, 1978) all seemed beyond teacher capabilities under the time constraints imposed by crowded school schedules and a growing reluctance by school boards of directors to add the costs of employing teachers in summer curriculum development.

The result of these factors defined the curriculum with these characteristics:

1. The curriculum should be longitudinal; concept, skill, and attitude reinforcing; and nutritionally comprehensive.

2. The curriculum should set basic nutritionally sound standards for decision-making.

3. The curriculum should be deliverable through various subject area disciplines already assigned importance by the nation's schools.

4. The curriculum should be comprised of exemplary instructional segments that are detailed, sound pedagogically, and nutritionally authentic.

5. Flexibility in presentation modes, learning activities and cultural identity should be preserved for school district norm-forming decision-making.

6. Material should encourage teachers to spin off ideas perceived as better than the norms formed by the curriculum.

7. The materials should include nutrition instruction for teachers that exceeds that presented to the students.

8. The materials should be addressed to the teacher rather than to serve as a student textbook.

9. Teacher preparation requirements should be as undemanding as possible. (Doyle and Ponder, 1977).

Virtually all curriculum development models include an evaluation or feedback component. The classical parametric experimental design is probably too purely scientific to be practical for most curriculum development projects aimed toward meeting perceived needs of the schools. The number of variables which can influence dependent variables is ponderous. Either the experimental design carves out atomistic influences one-by-one or looks holistically at the final impact on learners. Meaningful evaluation for curriculum development must provide systematic information about the dynamics within the development as well as the consequences of curriculum use.

A more sensible approach is that called "Evaluation Research" by Talmage, Hughes and Eash (1978). The focus of evaluation research addresses the effects of treatment and the processes of implementation on behaviors. Formative evaluation, one of five models described, is distinguished primarily by its applicability to programs under development.

Despite Posner's (1978) declared avoidance of evaluation as a process in his identification of curriculum research, the addition of a ninth domain, Planning and Development, and research incorporating combinations of domains, tends to legitimize evaluation as an integral part of curriculum development. Research associated with development is contrasted with research study about the other eight domains. Apparently formative evaluation research is akin to planning and development research.

The empirical research base for the development of Nutrition in a Changing World began with the survey of the SNE membership. The factor clusters of objectives and concepts were therby established. Appropriate leveling was investigated in several steps.

(1) Pilot lessons were forwarded to readers who were interested in nutrition and currently teaching students in the grade levels for which the respective lessons were designed. Some of the readers actually taught the lessons to their students. Only three messages came through consistently from the free responses: (a) information about the human body was not perceived as being nutrition despite its being limited to those functions closely related to nutrient delivery to the cells; (b) the multidisciplinary nature of the lessons was acceptable, but the structuring of learning activities to meet objectives in fields other than nutrition was seen as overstepping the purvue of nutrition educators; (c) lessons were perceived as being equivalent or better than other available nutrition material. Responses provided little insight into the appropriateness of the material to grade level or of the time demanded for instruction.

Since the free response approach did not generate adequately descriminating responses, the classes of twenty kindergarten and forty intermediate level teachers from volunteer districts were evaluated to ascertain the appropriateness of the materials for assigned levels and to obtain reliability data on test instruments. Teachers were asked to describe in logs the practical strengths and weaknesses of the instructional materials used.

Students using the curriculum demonstrated significant growth between pretest and posttest and significantly higher posttest scores than controls (Marbach, Plass, & Hsu, 1978; Bell, Turner, Carlson and Weiss, 1978). The kindergarten

pretest significantly affected the posttest in a positive direction, a finding which resulted in changing the procedure from individualized testing with foods to small group testing with drawings of foods. Pretest effects on the intermediate posttests were not significant.

Interestingly, grade level posttests showed the sixth grade mean as larger than fifth, which was larger than fourth, but the difference between fifth and sixth was not significant ($p<.05$). The free-response teacher logs disclosed no systematic hypothesis regarding the time spent, implementation problems, or any other explanatory clues about the results (Wood, Lewis, Angle & Nicely, 1978).

During the following year, in different districts, tighter control was built into the experimental design to ascertain the effects of two levels of nutrition instruction for teachers on their students' performance. Pretest effects and unit assignments to specific grade levels were tested. Highly structured teacher logs were used. The results will be available in July, 1979.

Administratively, several problems seem to be emerging: (1) program dependence upon use of foods in the curriculum is seen as a financial deterrent to implementation; (2) acceptance of the program by administrators produces uneven acceptance by the teachers.

None of the above research has examined impact beyond knowledge acquisition. Impact on student dietary behavior is yet to be examined formally after acceptance of the program by a school or district. However, under an ethnographic approach, a small district is being scrutinized for evidence of the curriculum's impact on the parents and community outside of the schools. One approach to inservice for teachers has been reported (Bell, 1978b) and two other approaches are being evaluated.

Obviously, the development and evaluation of Nutrition In A Changing World are still in progress. A dilemma always exists as to the appropriate time for reporting a curriculum development activity. The dynamic nature of the endeavor suggests that progress reports, and ultimately, historical or ethnographic research are appropriate. This paper constitutes a progress report.

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APPENDIX A

NUTRITION UNIT GRADE LEVEL SEQUENCE
Nutrition In a Changing World

Preschool (Early Childhood) Units (ages 3, 4, 5 years)

EC-1 Enjoy Food: See It
EC-2 Enjoy Food: See and Taste It
EC-3 Enjoy Food: Smell and See It
EC-4 Enjoy Food: Touch and Taste It
EC-5 Enjoy Food: Smell and Taste It
EC-6 Enjoy Food: Taste and Hear It
EC-7 Enjoy Food: We Need a Lot of Sense
EC-8 We Eat Plants: The Root Foods
EC-9 We Eat Plants: The Leaf Foods
EC-10 We Eat Plants: The Stem Foods
EC-11 We Eat Plants: The Fruit Foods
EC-12 We Eat Plants: The Seed Foods
EC-13 We Eat Meats from Animals
EC-14 We Eat Milk Products From Animals
EC-15 We Eat Eggs from Birds
EC-16 We Eat a Slice of Bread
EC-17 What Is and Isn't Food
EC-18 How Do I Feed My Teeth?
EC-19 How Do I Grow?
EC-20 How Do I Get My Energy?
EC-21 Food Variety for Good Balance
EC-22 Eating Together Is Fun
EC-23 Good Breakfasts
EC-24 Using the Food Machines
EC-25 Good Eating for Special Times
EC-26 Good Food Is Clean Food
EC-27 Television Says
EC-28 Good Manners
EC-29 Too Much, Too Little, Just Right!

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Primary Units (Grades K-3)

P-1 What Shall I Drink?
P-2 What's A Serving?
P-3 Food Variety for Good Learning
P-4 Food Variety in Other Lands
P-5 Nutritious Parties
P-6 Nutritious Holidays
P-7 Helping My Family Grocery Shop
P-8 Helping My Family Prepare Meals
P-9 The Nutrients I Need
P-10 Nutritious Munching
P-11 Being Friends at Lunchtime
P-12 Where Shall We Eat Out?
P-13 Raising My Own Food
P-14 Keeping My Teeth Healthy

Intermediate Units (Grades 4-6)

I-1 Your Body and Nutrients
- I-1-1 Health Means Wealth
- I-1-2 Your Changing Mirror Image
- I-1-3 What Is A Body?
- I-1-4 Getting Nutrients Out of Food
- I-1-5 What's In a Word?
- I-1-6 Getting Away From the Basics
- I-1-7 V. Villie Vinkie
- I-1-8 Gather at the Red River
- I-1-9 Lumpers and Splitters
- I-1-10 Waste - Rejects
- I-1-11 Waste - By-Products

I-2 Nutrients: "How Much Is Enough?"
- I-2-1 Introduction to Measurement
- I-2-2 Iron CaPAC Review
- I-2-3 What Is Energy?
- I-2-4 The RDA: Building a Doorway to Good Health
- I-2-5 Meterstick to Good Nutrition
- I-2-6 To B or Not To B, A Good Question
- I-2-7 Using the U.S. RDA to Find Nutritious Foods
- I-2-8 Nutritious Foods - Using the U.S. RDA Through Labels
- I-2-9 We Can Plan For Our Own Nutrition Needs

I-3 Nutrients and Growing
- I-3-1 Long Bone Structure
- I-3-2 Iron CaPAC and Bones
- I-3-3 Sizing You Up
- I-3-4 Miracle of Growth
- I-3-5 Surveying Growth
- I-3-6 Nutrition and Injury
- I-3-7 Exercise Your Nutrition Knowledge
- I-3-8 Taming of the Flu
- I-3-9 Who's Feeding the Baby?

I-4 Sheer Energy
- I-4-1 Energy Traps
- I-4-2 How Does Your Body Get Energy?
- I-4-3 How Does Your Body Use Energy?
- I-4-4 "Big E" Food: Fat
- I-4-5 Protein - A Builder, Not A Burner
- I-4-6 Sugar and Spice - Not So Nice
- I-4-7 Tip the Scales in Your Favor
- I-4-8 Plaque - Not A Pretty Picture

I-5 Proteins: The Body Builders
- I-5-1 AA-Not Anonymous
- I-5-2 The Case of the Missing Amino Acids
- I-5-3 Plant Proteins Rule the Protein Market
- I-5-4 The Safe Vegetarian
- I-5-5 Soy Ahoy!
- I-5-6 Protein Highs

I-6 Wanted: A "Perfect" Food
- I-6-1 Iron CaPAC Who?
- I-6-2 Sir Iron CaPAC
- I-6-3 Creating the "Perfect" Food
- I-6-4 "Perfect" Foods from Other Cultures
- I-6-5 How Do Others Combine Nutrients and Foods to Form "Perfect" Foods
- I-6-6 Let's Eat
- I-6-7 "Grade A" Lunch

I-7 Food Processing
- I-7-1 Do We Need Food Processing?
- I-7-2 Microorganisms: The Helpers and Hurters
- I-7-3 Where Do We Get Our Food?
- I-7-4 Processing of Old
- I-7-5 Some Like It Hot; Some Like It Cold
- I-7-6 Food Additives
- I-7-7 To Add or Not To Add
- I-7-8 Preserving Nutrients During Food Processing

I-8 Be Wise: Consumerize
- I-8-1 What Is A Wise Consumer
- I-8-2 Be A Wise Shopper: Read the Labels
- I-8-3 A Close Look at Advertising
- I-8-4 Beware of Consumer Pitfalls
- I-8-5 Ready Made or Do It Yourself
- I-8-6 Alternative Food Supplies
- I-8-7 Resources Which Aid Consumers